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Manufacturing 4.0 Transformation

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An industry on the brink of transformation

Manufacturers today are under tremendous pressure to improve operational efficiency while also becoming more agile than ever before. Modern manufacturing, also known as Manufacturing 4.0, promises decreased production times, higher product quality and process reliability while maintaining flexibility and adaptability — and also reducing costs. The future is here, and it's made up of seamlessly connected technologies: decentralized, digitized and automated operations that must be continuously self-optimized to increase business efficiency at all points throughout the manufacturing lifecycle. Supply chains are also becoming "smart," incorporating value chain processes to improve the experience across all points of communication and operations.

Manufacturing 4.0 leverages the convergence of technologies to integrate manufacturing automation, data exchange, analysis and collaboration. The result is a "smart factory," in which physical manufacturing processes are managed and improved by connected systems that rely on data for continuous process refinement and improvement. These smart factories are built on the concept of interoperability. Machines, devices, sensors and people must all be able to connect and communicate. IT automation is a necessity. The elimination or reduction of manual processes results in a more streamlined business, answering the demand to increase profit margins, improve product lifecycles and do more with less.
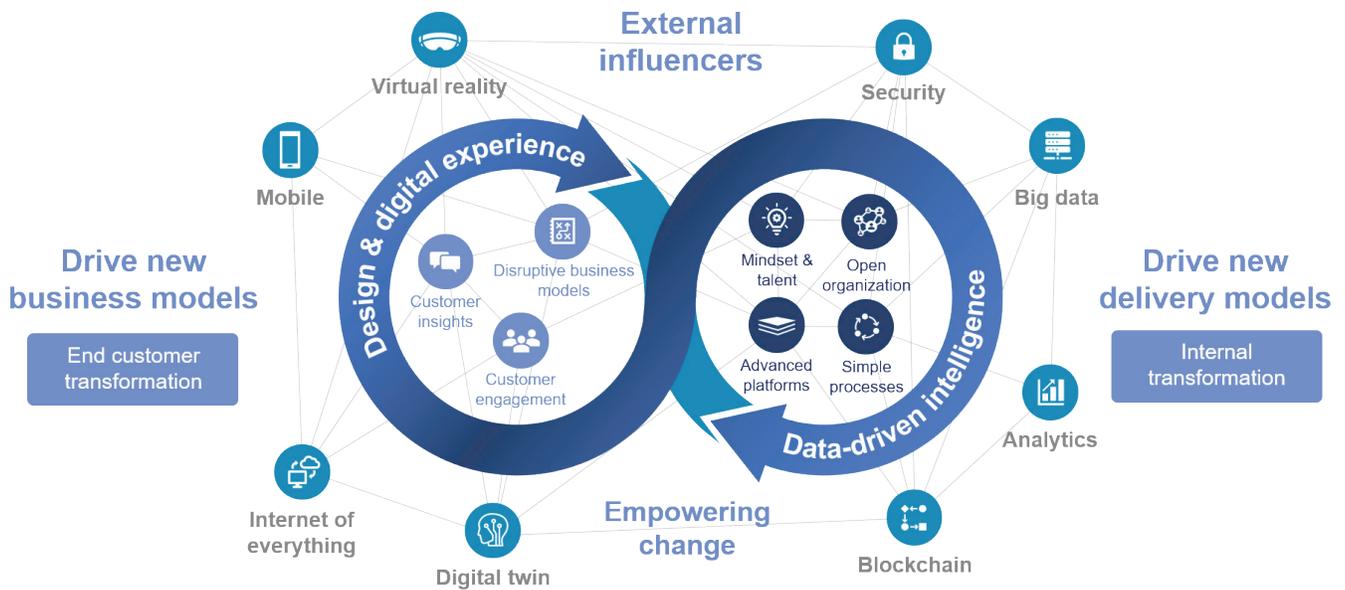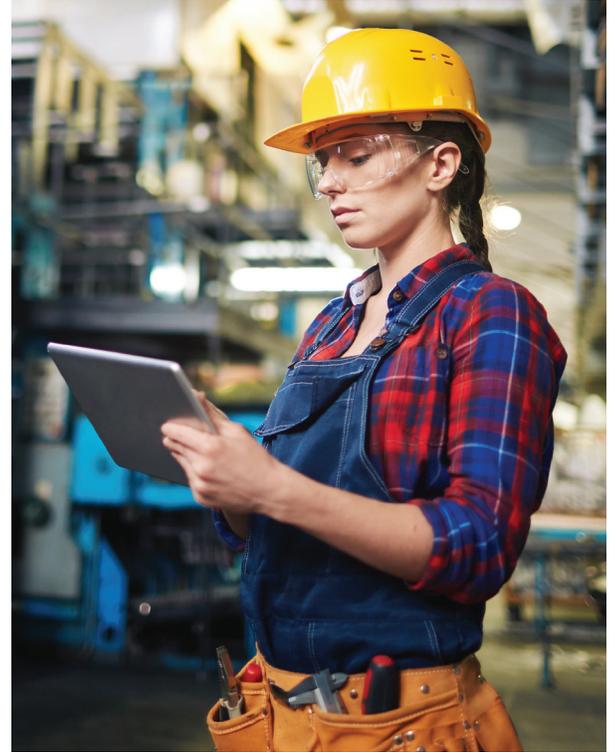

Figure 1: Manufacturing 4.0 leverages the convergence of technologies to integrate manufacturing automation, data exchange, analysis and collaboration.

Common challenges to IT modernization

No manufacturing establishments currently have a completely streamlined IT environment.[1]
A number of common challenges exist across today's manufacturing environment:

Legacy IT architecture. The biggest challenge to IT modernization is legacy systems. Older IT infrastructures simply weren't designed for integration with new technology. At best, connection can be difficult, and at worst, it may be impossible to upgrade existing systems to meet the demands inherent in this new reality. These infrastructures need to be re-architected to seamlessly integrate hardware, software and people. Many large manufacturers are reliant on legacy IT architecture, and these disparate systems can lead to an integration nightmare.

Siloed processes. Compounding the problem: the larger the enterprise, typically the more decentralized it may be — and that decentralization will only increase. Distributed factories and a distributed workforce aren't the issue. However, decentralization often leads to siloed processes. It's not unusual for manufacturers to have multiple digital solutions in place, each used only by certain groups. These solutions aren't integrated, so it becomes progressively more difficult to collectively compile and analyze data. Not only are the solutions disconnected, so are the employees — without any drivers or communication processes in place, it's natural for groups to work within their own teams and become resistant to change.

Cybersecurity. This is one of the primary drivers for IT modernization. Legacy IT systems present a prime opportunity for adversaries attempting to exploit weaknesses in security infrastructure. As security threats become increasingly more sophisticated, it's more important than ever to address these vulnerabilities. Outdated technology often contains loopholes that may allow attackers access to internal systems.

Enablers for IT modernization

IT should be the enabler for these new business models, reimagining both organization and process. But this may require systemic change. Replacing legacy systems and integrating new technologies into existing systems must become a higher priority to streamline IT processes. Manufacturers should keep three key focus areas top of mind when planning a modernization strategy:

Transformative technologies. Developments in the internet of things (IoT), big data, cloud, mobile, 3D printing, modeling and simulation, and shop-floor analytics are converging. Investment and research in artificial intelligence (AI) is growing every day. These new technologies, combined with customer journey digitization and intelligent analytics, are driving a shift from reactive to proactive processes both on the shop floor and in facilities, with an ultimate goal of improved profitability and increased customer satisfaction.

Enterprise digitization. Enterprise digitization will enable manufacturers to become more customer-centric and more efficient. As the volume of data to be processed continues to increase exponentially, it becomes impossible to leverage the value of the data without advanced predictive analytics and connectivity with both systems and people. Achieving a completely digitized environment takes time, but the industry-leading manufacturers that are willing to invest in the process will reap the rewards of a completely connected value chain.

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Streamlined IT. Manufacturing is moving to a model of collaborative decentralization. Interoperability is key. To stay responsive — and competitive — manufacturers will need to have a scalable, reusable, extensible and reliable IT architecture in place to ensure always-on connectivity and communication. This requires modernizing and streamlining IT by replacing legacy systems and integrating new technologies into existing systems.

Planning your journey to Manufacturing 4.0

To move from today's systems to the modernized manufacturing environment of the future, an IT paradigm shift is inevitable. The role of IT in manufacturing modernization should be that of a collaborative leader, throughout all the stages of manufacturing transformation — from process to people. Follow these three steps:

Assess the environment

An assessment of current systems and points for potential integration failure will help determine what new architecture may be required. Assessments should track where the organization is now and register where it wants to go, so leadership can determine how to get there. This benchmarking provides the ability to map out the journey with key milestones and implementation timelines.

Recognize the convergence of IT and OT

Modernized environments require that IT become more integrated with operational technologies (OT), providing a connected environment that eliminates silos and enables seamless exchange of information at every stage. Benefits include real-time traceability of quality issues, closed-loop feedback on design principles and the ability to innovate based on customer input. The first step toward digitization is to standardize IT infrastructure enterprise-wide, providing the seamless connectivity required to bring processes and people together. Using technology that interconnects the manufacturing process data at all stages allows for real-time adjustments to products, improved communication with customers and a more effective supply chain overall.

Form strategic technology partnerships

While streamlining IT processes is imperative, it can be difficult to determine the right steps toward modernization in-house due to resource and bandwidth constraints, so organizations may wish to partner with a third-party solution provider. These providers can help organizations make and implement the right decisions to increase profits. Strategic technology partners should have experience with system integrations that implement a variety of solutions, delivering the capability for faster, greater expansion opportunities as well as the ability to stay competitive and innovate further.

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Manufacturing 4.0 is here, and it will transform the way manufacturers do business. For a smooth evolution, IT must take a collaborative leadership role through every stage of manufacturing transformation. Modernizing manufacturing will require strategic planning, partnerships and investment — but the results will be worth it: smarter, faster and simpler business operations.

Let's get started

NTT DATA leverages proven methodologies and innovation to address the people, process and technology challenges inherent in implementing Manufacturing 4.0. We can connect the links in your manufacturing value chain to enable rapid, seamless business processes. With our industry-leading services and intelligent platforms that improve discrete and process manufacturing, we can help you become ready for tomorrow. As a proven, trusted technology solutions provider, we don't just give you solutions, we work with you to discover them.

Build a smart factory — together

We can help your factory become a smart factory. It starts with partnership; we work with you to conduct assessments and engage front-line team members, communicating throughout all levels of the organization. Next, we work together to deliver operational metrics to the right person at the right time and to automate and integrate, enabling data-driven decision-making. The final steps are transforming data into intelligence that drives manufacturing outcomes and deploying connected security across your enterprise to safeguard data, from the device to the cloud.

Don't have an IoT strategy? We can help you build one and create the roadmap to execute it, and even provide the end-to-end solutions and services to enable an entire IoT ecosystem. **Need predictive analytics?** We can recommend and implement the right analytics and data mining platform and technologies so you can uncover value and insights from enterprise data accumulated over decades, make faster and smarter decisions across the enterprise, increase the productivity of business users and improve customer satisfaction.

Shift your focus from infrastructure to business

Managing end users in the digital and cloud era is a complex task. Add the convergence of business and IT, and the result is maxed-out IT resources that are unable to get it all done. Budgets are shrinking, complexity is rampant, and demands are growing faster than IT leaders can plan, manage and execute with traditional solutions. We can help you improve productivity and collaboration, as well as create a mobile, productive, secure and empowered workforce with our managed role-based end-user services.

Invest less in maintenance, more in innovation

Application modernization services shift IT spend from maintenance to innovation and change the focus from cost savings to business agility. We provide an end-to-end portfolio of solutions that offers flexibility, uncovers new sources of revenue and creates an adaptive enterprise. Our portfolio includes strategic modernization roadmapping, application re-hosting and re-architecture, and mid-tier modernization migration.

Get results faster from your business apps

Are you looking for faster results and time to market for your next implementation? We can implement applications such as leading enterprise resource planning, customer relationship management, human capital management (including HR and payroll) and vendor management offerings in a matter of weeks, delivering faster time to value while reducing project risk, improving predictability and lowering overall implementation costs.

Transform business processes with technology and automation

No two businesses are alike. We take an agile, customized approach to business process outsourcing (BPO). We create process optimization and efficiency by building synergies between IT and BPO, helping streamline your processes to meet your revenue, budget, efficiency and customer satisfaction goals.

Visit nttdataservices.com/mfg to learn more about how NTT DATA can help you transform your business.

Source: 1 NTT DATA Services and Frost and Sullivan. "Manufacturing 4.0: Navigating to Digital Success." October 2019.
https://us.nttdata.com/en/-/media/assets/white-paper/the-new-imperatives-of-manufacturing-40.pdf

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NTT DATA Services partners with clients to navigate and simplify the modern complexities of business and technology, delivering the insights, solutions and outcomes that matter most. As the largest division of NTT DATA, a top 10 global business and IT services provider, we combine deep industry expertise with a comprehensive portfolio of consulting, application, infrastructure and business process services.

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